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### CALFEE, HALTER & GRISWOLD LLP

October 7, 2003

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FROM: John E. Miller, Esq.

**DIRECT DIAL PHONE NUMBER: 216-622-8679** 

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CLIENT NO.: 27200/04005

CLIENT NAME: Magic American

NUMBER OF PAGES (including this page): 14

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Debra L. Hale

PATENT

### IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450

### SUPPLEMENT TO AMENDMENT

Dear Sir:

Supplemental to the Amendment filed on October 3, 2003, applicant provides for the Examiner's convenience updated MSDS's for n-methylpyrrolidone and  $\gamma$ -butyrolactone. As can be seen from these documents, both of these solvents are recognized as being eye irritants.

Respectfully submitted,

John E. Miller, Reg. No. 26,206

(216)622 8679

{DXH4304.DOC;1}

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## **Material Safety Data Sheet**

Date Printed: 10/06/2003 Date Updated: 09/08/2002 Version 1.80

### Section 1 - Product and Company Information

Product Name

1-METHYL-2-PYRROLIDINONE. 89+%, HPLC GRADE

Product Number 270458

Aldrich Chemical

**Brand** 

Сопраму Street Address

Sigma-Aldrich 3050 Spruce Street

City, State, Zip, Country

SAINT LOUIS, MO 63103 US

Technical Phone: Faxe

314 771 5765 800 325 5052

Emergency Phone:

414 279 3850 Ext. 5998

### Section 2 - Composition/Information on Ingredient

<u>Substance Name</u>

1-METHYL-2-PYRROLIDINONE

CAS# 872-50-4

**SARA 313** Yes

Formula

C5H9NO

Synonyme

N-Methylpyrrolidinone, N-Methyl-2-pyrrolidinone, 1-Methyl-2-pyrrolidinone, 1-Methyl-5-pyrrolidinone, N-Methylpyrrolldone, N-Methyl-alpha-pyrrolldone, N-Methyl-2-pyrrolldone, 1-Methyl-2-pyrrolldone,

M-Pyrol, NMP

### Section 3 - Hazards Identification

### **Emergency Overview**

mitant.

intating to eyes and skin.

Combustible. Target organ(s): Bone marrow. Spiecn. Calif. Prop. 65 reproductive hazard.

**HMIS Rating** 

Health: 2\*

Flammability: 2

Reactivity: 1

NFPA Rating

Health: 2

Flammability: 2

Reactivity: 1

\*additional chronic hazarda prezent,

For additional information on toxicity, please refer to Section 11.

### Section 4 - First Aid Measures

### **Cral Exposure**

if swallowed, wash out mouth with water provided person is conscious. Call a physician.

### Inhelation Exposure

If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

### Dermal Exposure

In case of contact, immediately wash skin with soap and copious amounts of water.

Eye Exposure

In case of contact, immediately flush eyes with copious amounts of water for at least 15 minutes.

### Section 5 - Fire Fighting Measurea

Flammable Hazards:

Yes

Flesh Point:

187 °F

88 °C

Explosion Limits:

Lower: 1.3 %

Upper: 9,5 %

Autolgnition Temp:

270 °C

Flammobility:

Yes

Exdinguishing Media

Sultable

Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

**Firefighting** 

**Protoctive Equipment** 

Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

Specific Hazard(e)

Emits toxic furnes under fire conditions. Combustible liquid.

### Section 6 - Accidental Release Measures

Procedure(e) of Personal Precaution(n)

Wear respirator, chemical safety goggles, rubber boots, and heavy rubber gloves.

Methods for Cleaning Up

Absorb on sand or vermiculite and place in closed containers for disposal. Ventilate area and wash split site after material pickup is complete.

### Section 7 - Handling and Storage

Handling

**User Exposure** 

Do not breathe vapor. Avoid contact with eyes, skin, and cicthing. Avoid prolonged or repeated exposure.

Storage

6uitable

Keep tightly closed. Keep away from heat and open fiame. Store in a cool dry place.

Special Requirements

Moisture eensitive Store under inert das.

### Section 8 - Exposure Controls / PPE

Engineering Controls

Mechanical exhaust required. Safety shower and eye bath,

Personal Protective Equipment

Respiratory

Government approved respirator.

Hand

Compatible chemical-resistant gloves.

Ęy≠

Chemical safety goggles.

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General Hygiene Meagures Wash thoroughly after handling.

### Section 9 - Physical/Chemical Properties

Арреагалсе

Physical State ∐quid

Color Colorioss

Molecular Weight:

**99.13 AMU** 

**Property** 

<u>Value</u>

рΗ

7.7 - 8 78 - 79 °C

BP/BP Range MP/MP Range Freezing Point

-24 °C -23.6 °C

Vapor Pressure Vapor Deneity

0.29 mmHg 3.4 9/

Saturated Vapor Conc. SG/Density

N/A 1.032 g/cm3

**Bulk Density** Odor Threshold

NA N/A

Voistile% **VOC Content** Weter Content Solvent Content

**Evaporation Rate** 

N/A NA < 0.01 % N/A NA

Viscosity Surface Tension **Partition Coefficient** Decomposition Temp. 0.002 Pas 40.7 mN/m

Log Kow: -0.46 N/A

Flosh Point °F Flash Point °C Explosion Limits

187 °F 88 °C Lower: 1,3 %

Upper: 9.5 % Flammability N/A 270 °C Autolgnition Temp

Refractive Index Solubility

1.47

Other Solvente: MISCIBLE IN WATER, LOWER, ALCOHOLS AND KETONE, ETHYL ACETATE, CHUROFORM, BENZENE,

At Temperature or Pressure

Method: closed cup

Method: closed cup

12 mmHg

20 °C

20 °C

N/A = not available

### Section 10 - Stability and Reactivity

Stability

Stable

Stable.

Conditions to Avoid Protect from moisture.

Materials to Avoid

Strong acids, Strong exidizing agents.

Hazardous Decomposition Products Hezardous Decomposition Products Carbon monoxide, Carbon dioxide.

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### Hazardous Polymerization Hazardous Polymerization

Will not occur.

### Section 11 - Toxicological Information

### Route of Exposure

**Skin Contact** 

Causes skin Intitation.

Skin Absorption

May be harmful if absorbed through the skin.

Eye Contact

Causes eve initation.

Inheletion

May be harmful if inhaled. Material may be imitating to muccus membranes and upper respiratory tract.

May be harmful if ewallowed.

Target Organ(a) or System(s) Bone manow, Thymus, Spieen. Lymphatic system.

Signs and Symptoms of Exposure

Prolonged exposure can eques: Stomach pains, vomiting, diarrhea, Plats exposed to 1-methyl-2-pyrrolidinone at a concentration of 1 mg/L as an aerosol for 10 days showed depletion of hematopoletic cells in the bone marrow and atrophy of the tymphold tissues of the thymus, spicen, and lymph nodes.

RTECS Number: UYS790000

### Toxicity Data

Oral - Rat: 3,814 mg/kg (LD50)

Intraperitorieal - Rat: 2472 MG/KG (LD50)

Subcutaneous - Rat: >2 GM/KG (LD50)

Intravenous - Rat: 80500 UG/KG (LD50)

Oral - Mouse: 5,130 mg/kg (LD50)

Intraperitoneal - Mouse: 3050 MG/KG (LD50)

Intravenous - Mouse: 54500 UG/KG (LD50)

Intravenous - Dog: 63300 UG/KG (LD50)

Skin - Rabbit; **8,000 mg/kg** (LD50)

### **kritation** Data

Eyes - Rebbit: 100 mg

Remarks: Moderate irritation effect

#### Chronic Exposure Carelnogen

Mouse - Oral: 784 GM/KG 78W C

Result: Tumorigenic:Carcinogenic by FITECS criteria. Liver:Tumors.

Chronic Exposure - Teratogen

\$pacies Rat

8700 MG/KG

<u> Poute of Application</u>

**Pipasure Time** (6-15D PREG)

Oral Result Effects on Embryo of Fetus: Fetal death.

Spacific Developmental Abnormalities; Other developmental abnormalities.

Ret

118 PPM/6H

Inhalation

(MULTIGENERATION

Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus),

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Chronic Exposure - Reproductive Hazard

Species Rat Dose 150 PPM/8H Boute of Application Exposure Time Inhalation (7-20D PREG)

Result: Effects on Newborn: Growth statistics (e.g., reduced weight gain). Effects on Newborn: Delayed effects.

(6-15D PREG) Result: Effects on Fertility: Post-Implantation mortality (e.g., dead and/or resorbed implants per total number of implants). Effects on Fertility: Litter size (e.g.; # fetuses per litter; measured before birth). Effects on Embryo or Fetus: Fetotoxicity

(except death, e.g., stunted fetus), 7500 MG/KG

Skin (8-16D PREG)

Result: Maternal Effects: Other effects. Specific Developmental Abnormalities: Musculoskeletal system. Plat 186 MG/KG intraperitorical (90 PREG)

Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or reserved implants per total number of implants). Specific Developmental Abnormalities: Central nervous system, Specific Developmental Abnormalities: Musculoskeletal

Mouse

Ret

Plet

12825 MG/KG Oral (11-15D PREG)

Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus), Specific Developmental Abnormalities:

Craniplacial (including nose and tongue). Mouse

7825 MG/KG Intraperitoneal (11-160 PREG)

Pleault: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abriormalities: Craniofacial (Induding nose and tongue).

### Section 12 - Ecological Information

#### Acute Ecotoxicity Teste

**Test Type** EC60 Daphnia Species

Daphhia magna

Thre Value: 24.0 h > 1,000 mg/l

Test Type IC50 Algae

Time: Value: 72 0 h > 500 mg/l Test Type

LC50 Bacteria

Value:

> 9,000 mg/l

**Test Type** 

LC50 Fish

Times Velue: 96.0 h 4,000 mg/l

### Elimination

### Section 13 - Disposal Considerations

### Appropriate Method of Disposal of Substance or Preparation

Contact a licensed professional waste disposal service to dispose of this material.

This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Observa all federal, state, and local environmental regulations.

### Section 14 - Transport Information

Proper Shipping Name: Combustible liquid, n.o.s.

UN#: 1983

Class: COMBUSTIBLE LIQUID Packing Group: Packing Group III

Hazard Label: None.

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PIH: Not PIH

Non-Hezardous for Air Transport: Non-hazardous for air transport.

### Section 15 - Regulatory Information

### EU Directives Classification

Symbol of Danger: Xi

Indication of Danger

Inflant,

Risk Statements

R: 86/38

irritating to eyes and skin.

Safety Statements

S: 41

in case of fire and/or explosion do not breathe furnes,

### US Classification and Label Text

Indication of Denger

Intitant.

Risk Statements

Imitating to eyes and skin.

Safety Statements

In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing. In case of fire and/or explosion do not breathe fumes.

**US Statements** 

Combustible. Target organ(s): Bone marrow. Spleen. Calif. Prop. 65 reproductive hazard.

### United States Regulatory Information

SARA Licted: Yes

Deminimic: 1 %

Notes: This product is subject to BARA section 313 reporting requirements.

### TSCA Inventory item: Yes

### United States - State Regulatory information

California Prop - 65

This product is or contains chemical(s) known to the state of California to cause developmental toxicity.

### Canada Regulatory Information

WHMIS Cleanification

This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.

OSLI Yes

NDSLI No

### Section 16 - Other Information

#### Disclainer

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## Material Safety Data Sh

Date Printed: 10/06/2003 Date Updated: 04/16/2003 Version 1,40

### Section 1 - Product and Company Information

Product Name

y-Butyrolactone, 89+%

**Product Number** Brand

B103608

Aldrich Chemical

Company Street Address

Sigma-Aldrich

City, State, Zip, Country

3050 Spruce Street SAINT LOUIS, MO 63103 US

Technical Phone:

314 771 5765

Emergency Phone:

414 273 3850 Ext 5998

Fax:

800 325 5052

### Section 2 - Composition/Information on Ingredient

**Bubstonce Name** GAMMA-BUTYROLACTONE

CAS # <del>96-48-0</del>

**SARA 313** No

Formula Эупопутр

C4H6O2

gamma-6480, Agrisynth BLO, gamma-BL, 4-Butanolide, 1,2-Butanolide, 1,4-Butanolide, Butyric acid, 4-hydroxy-, gamma-lectone, Butyric acid lactone, Butyricatione, gamma-Butyricatione, 4-Butyrolactone, Butyrylactone, Butyryliactone, C-1070, 4-Deoxytetronic acid, Dihydro-2(3H)-furanone, 4-Hydroxybutanoic acid lactone, 4-Hydroxybutanoic acid, gamma-lactone, gamma-Hydroxybutyric acid syclic ester. 4-Hydroxybutyric acid lactons, 4-Hydroxybutyric acid, gammalactone, gamma-Hydroxybutyrio acid lactone, gamma-Hydroxybutyrolactone, NCI-CE5878, 2-Oxolanone, Tetrahydro-2-furanone

### Section 3 - Hazards identification

### Emergency Overview

Hamfut.

Harmful if swallowed. Irritating to eyes. Target organ(s): Central nervous system.

**HMIS Reting** 

Health; 2\*

Flammability: 1

Reactivity: 1

NFPA Rating

Health: 2

Flammability: 1

Reactivity: 1

\*additional chronic hazards present.

For additional Information on toxicity, please refer to Section 11.

### Section 4 - First Ald Measures

### Oral Exposure

If swallowed, wash out mouth with water provided person is conscious. Call a physician.

### Inhelation Exposure

If inhaled, remove to fresh air, if breathing becomes difficult, call a physician.

### 3:01PMPAX 2:CALFEE HALTER GRISWOLD CAMERICAN CORP 5igma-Aldrich

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Dermal Exposure

in case of contact, immediately wash skin with soap and copious amounts of water.

Eye Exposure

In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyellds with fingers. Call a physician.

### Section 5 - Fire Fighting Measures

Explosion Hazarda

Vapor/air mixtures are explosive at high temporatures.

Flash Point:

208.4 °F

98 °C

Explosion Limits:

Lower: 1.4 %

Upper: 18 %

**Autoignition Temp:** 

455 °C

Extinguishing Madia

Suitable

Water spray. Carbon dioxide, dry chamical powder, or appropriate foam.

Firefighting

Protective Equipment

Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

Specific Hazard(s)

Emits toxic fumes under fire conditions.

### Section 6 - Accidental Release Measures

Procedure to be Followed in Case of Lask or Spill

Evecuate area.

Procedure(s) of Personal Precaution(s)

Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

Methods for Cleaning Up

Absorb on sand or vermiculitie and place in closed containers for disposal. Ventilate area and wash split site after material pickup is complete.

### Section 7 - Handling and Storage

**Handling** 

User Exposure

Do not breathe vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

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Storage Suitable

Keep tightly closed.

Special Requirements Hygroscopic.

### Section 8 - Exposure Controls / PPE

Engineering Controls

Safety shower and eye bath, Mechanical exhaust required.

Personal Protective Equipment

Respiratory

Government approved respirator.

Hand

Compatible chemical-resistant gloves.

Eye

Chemical safety googles.

General Hygiene Massures

Wash thoroughly after handling.

### Section 9 - Physical/Chemical Properties

Appearance

Physical State

Clear liquid

Color Coloriess

Môlecular Weight:

**UMA 60.88** 

**Property** 

**Value** 

At Temperature or Pressure

pН

BP/SP Range

N/A 204 - 205 °C

760 mmHg

20 °C

MP/MP Range Freezing Point Vapor Pressure

Vapor Density

-45 °C

N/A

1.5 mmHg

3 g/l N/A

Saturated Vapor Conc. SG/Density

1.129 g/cm3

**Bulk Density** Odor Threehold

N/A N/A

Volatile% **VOC Content** 

N/A N/A

Water Content Solvent Content Evaporetion Rate

N/A N/A N/A

Viscosity **Partition Coefficient** Decomposition Temp.

N/A Log Kowr. -0.57 N/A

Flach Point of Firsh Point \*C

208.4 °F 88 °C

Explosion Limits

Lower: 1,4 % Upper: 16 %

Flemmability Autoignition Temp Refractive Index

N/A 455 °C 1.437

Method: closed cup Method: closed cup

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Solubility

N/A

N/A = not available

### Section 10 - Stability and Resctivity

### Stability

Stable

Stable,

Conditions of Inetability

Hygroscopio,

Materials to Avoid

Strong acids, Strong bases, Strong oddizing agents, Strong reducing agents, Zinc, Plastics,

### Hazardoua Decomposition Products

Hazardous Decomposition Products

Carbon monoxide, Carbon dioxide.

### Hazardous Polymerization

Hazardoua Polymerization

Will not occur.

### Section 11 - Toxicological Information

### Route of Exposure

Skin Contact

May cause skin irritation.

Skin Absorption

May be harmful if absorbed through the skin.

**Eye Contact** 

Causes eye irritation.

inhelation

May be harmful if inhaled. Material may be initiating to muceus membranes and upper respiratory tract.

Ingestion

Harmful if swallowed.

### Terget Organ(e) or System(e)

Central nervous system.

Signs and Symptoms of Exposure

Inhalation may have an anesthetic effect on the central nervous system characterized by a loss of sensation. Preliminary excitement is the Initial effect followed by relexation, stupor, or sleep. Exposure can cause: Nausea, dizziness, and headache,

### RTECS Number: LU3500000

### **Taxicity Data**

Oral - Rat: 1,540 mg/kg (LD50)
Remarks: Behavioral:Altered sleep time (Including change in righting reflex).

Behavioral:Somnolence (general depressed activity).

Lungs, Thorax, or Respiration:Respiratory depression.

Inhalation - Fat: > 5,100 mg/m3 (LC50)

Intrapertoneal - Rat: 1 GM/KG (LD50)

Remarks: Behavioral:General anesthetic.

Lungs, Thorax, or Respiration: Other changes,

Oral - Mouse: 1,460 mg/kg (LDSO)

Remarks: Behavioral:General anesthetic.

Behavioral; Somnolence (general depressed activity).

Lungs, Thorax, or Respiration:Respiratory depression.

Intraperitoneal - Mouse: 1100 MG/KG (LD50)

Remarks: Behavioral; General anesthetic.

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#### 3:02PMFAX 2:CALFEE HALTER GRISWOLD: AMERICAN CORP 10/08/2003 01:23PM Sigma-Aldrich

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Lungs, Thorex, or Respiration: Other changes,

Skin - Guinea pig: > 5,000 mg/kg (LD50)

#### **Unitation** Date

Skin - Rabbit: 0.5 ml

Flormarks: Severe Imitation effect

Chronic Exposure - Carcinogen

Presult. This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

Mouse - Oral: 191 GM/KG 2Y C

Result: Turnorigenic: Equivocal tumorigenic agent by RTECS criteria. Endocrine: Adrenal cortex tumors.

Mouse - 8kin: 50 GM/KG 42W |

Result: Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Skin and Appendages: Other: Tumors.

Tumorigenic:Tumors at alte or application,

### IARC Carcinogen List

Basing Group 9

NTP Cercinogen List

Equivocal evidence.

No evidence.

Species

Mouse

Route

Gavage Gavage

Chronic Exposure - Teratogen

Species Ret

500 MG/KG

Route of Application

Exposure Time

(8-15D PREG) Result Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Chronia Exposure - Mutagen

Species Hamster Dose

25 MG/L

Cell Type kidney

Mutation test

Hamater

2580 MG/L

ovary

Morphological transformation.

Hamster

4940 MG/L

ovary

Cytogenetic analysis Sister chromatid exchange

Chronic Exposure • Reproductive Hazard

<u>Species</u> Flat

<u>Dose</u> 25 GM/KG

Route of Application Oral

eniT enuegax 20D MALE

Result: Paternal Effects; Testes, apididymis, sperm duct.

### Section 12 - Ecological Information

### Acute Ecotoxicity Tests

Test Type LC50 Fish

Species Leuciscus (dus

Time: 96,0 h Value:

> 220 mg/l

### Section 13 - Disposal Considerations

### Appropriate Method of Disposal of Substance or Preparation

Contact a licensed professional waste disposal service to dispose of this material.

Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an atterburner and scrubber. Observe all federal, state, and local environmental regulations.

Aidrich Chemical - B103608

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### Section 14 - Transport Information

DOT

Proper Shipping Name: None

Non-Hexardous for Transport: This substance is considered to be non-hazardous for transport.

**IATA** 

Non-Hazardous for Air Transport: Non-hazardous for air transport.

### Section 15 - Regulatory Information

### **EU Additional Classification**

Symbol of Danger: Xn

Indication of Danger

Harmful.

Rick Statements

R; 22 36

Harmful if swallowed, Irritating to eyes.

Safety Statements

St 26 38

In case of contact with eyes, rinse immediately with plenty of water and sask medical advice. Wear suitable protective clothing.

### US Classification and Label Text

Indication of Danger

Harmful.

Rick Statements

Harmful if swallowed, Irritating to eyes.

Safety Statements

in case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing.

US Statementa

Target organ(s): Central nervous system.

### United States Regulatory Information

SARA Listed: No

### TSCA inventory item: Yes

### Canada Regulatory Information

WHMIS Classification

This product has been classified in accordance with the hazerd criteria of the CPR, and the MSDS contains all the information required by the CPA.

DSL: Yes

NDSL: No

### Section 16 - Other Information

### Discloimer

For R&D use only. Not for drug, household or other uses,

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